If you are using a printed copy of this procedure, and not the on-screen version, then you MUST make sure the dates at the bottom of the printed copy and the on-screen version match.
The on-screen version of the Collider-Accelerator Department Procedure is the Official Version.
Hard copies of all signed, official, C-A Operating Procedures are kept on file in the C-A ESHQ Training Office, Bldg. 911A.

C-A OPERATIONS PROCEDURES MANUAL

7.1.44 Warm Turbine "A" Train Online and "B" Train Offline

Text Pages 2 through 4

Hand Processed Changes

HPC No.	Date	Page Nos.	Initials

Approved: _____***Signature on File***_____ _____
Collider-Accelerator Department Chairman Date

S. Sakry

7.1.44 Warm Turbine "A" Train Online and "B" Train Offline

1. Purpose

1.1 To provide instructions for placing warm turbine train "A" online and taking warm turbine "B" train offline.

1.2 If desired, both trains can operate at the same time, with one or both trains being shut down at a later date.

2. Responsibilities

2.1 The Shift Supervisor, or an Operator designated by the Shift Supervisor, is responsible for conducting the procedure and providing documentation in the Cryogenic Control Room Log.

2.2 Should a problem arise in the process of this procedure, the Shift Supervisor shall report to the Technical Supervisor for instructions before continuing.

3. Prerequisites

None

4. Precautions

4.1 If there is liquid helium in the refrigerator pots, all personnel entering the refrigeration wing of 1005R must be ODH Class 1 qualified, have a Personal Oxygen Monitor (POM), and carry an escape pack.

5. Procedure

_____ 5.1 Date_____.

_____ 5.2 Isolate CR line from LSA/rings and align path to return as follows:

Close Valves:

H26A____	H4659M____
H849A____	H341M____
H4644A____	H344A____

Open Valves:

H4643A____	H425M____
H827M____	H360M____
H5M____	

_____ 5.3 Initialize “A” train per C-A-OPM 7.1.40, “Warm Turbines “A” Train Initialization.”

_____ 5.4 Disable HX3 temperature balance control as follows:

5.4.1 Ensure valve H344A is in manual and closed____.

5.4.2 Place valve H744A in manual and leave in current position____.

Caution:
To prevent overspeed of turbines, the system pressure must be less than 7 atm prior to turbine start up.

Note:
If switching trains as “A” train is brought up, “B” train should be slowed down to make the switchover as smooth as possible.

_____ 5.5 Start warm turbine “A” train. Set flow to approximately 250 g/s.

_____ 5.6 When outlet temperature of turbine 4 (TI361H) is within 5^{o}K of TI14H, start to open valve H380A. Monitor compressor return temperature (T13063H), ensure it does not drop too low (alarms at 260^{o}K).

_____ 5.7 When valve H380A is approximately 30% open and the refrigerator is stable, slowly close valve H360M. Turbine 4 outlet pressure (PI361) should stay below 1.8 atm.

_____ 5.8 Close valve H425M.

_____ 5.9 Adjust valve H380A until PI361H is approximately 1.40 atm (its normal operating condition), place valve H380A in automatic.

_____ 5.10 Open valve H341M.

_____ 5.11 Slowly open valve H344A until inlet temperature at HX 1/2 stabilizes (TI304 for 1A/2A, TI704 for 1B/2B).

_____ 5.12 Place valve H344A in automatic.

_____ 5.13 Adjust turbine speed and place vane controllers in automatic, as required.

_____ 5.14 Monitor turbine seal gas flow while transferring heat shield.

_____ 5.15 To transfer heat shield place valve H9A in manual and set flow to approximately 50 g/s.

_____ 5.16 Slowly open valve H376M_____ and close valve H776M_____.

_____ 5.17 Place valve H9A in automatic. Set point at 300 g/s.

_____ 5.18 To realign the CR line, open valve H4644A.

_____ 5.19 If both trains are to run, place valve H744A in automatic, and do not complete the remainder of section 5 at this time.

_____ 5.20 Slow down and then shut down "B" turbine train.

_____ 5.21 Close valve H744A.

_____ 5.22 Place valve H780A in manual and ensure it is closed.

_____ 5.23 Ensure "B" train turbine inlet filter valves H9122M____ and H9130M____ are closed.

_____ 5.24 Shut down turbines 1B/2B and 3B/4B oil skids per C-A-OPM 7.1.48, "Shutdown of Warm Turbine Oil Skids."

6. Documentation

6.1 The check-off lines on the procedure are for place keeping only. The procedure is not to be initialed or signed, it is not a record.

6.2 The Shift Supervisor shall document the completion of the procedure in the Cryogenics Control Room Log.

7. References

7.1 Drawing 3A995001, 25KW Refrigerator P&ID.

7.2 C-A-OPM 7.1.40, "Warm Turbines "A" Train Initialization".

7.3 C-A-OPM 7.1.48, "Shutdown of Warm Turbine Oil Skids".

8. Attachments

None